Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Marine Engineering) (2013 Onwards)/(ME) (2011 Onwards)
(Sem.–3)

ENGINEERING MATERIALS AND METALLURGY

Subject Code : BTME-306

Paper ID : [A1143]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a. State the no. of atoms on a plane having miller indices of (110) in a B.C.C. unit cell.

b. Define the terms polymorphism and allotropy.

c. Why is it that theoretical strength of metals is much higher than that observed experimentally?

d. Write the equations for Gibb's phase rule & modified phase rule.

e. Differentiate between a eutectic point and a congruent point in relation to binary phase diagrams.

f. Why there are three curves in TTT diagram for a hypo eutectoid steel but only two curves for a eutectoid steel.

g. Why is quenching not required while cooling the component during nitriding?

h. Name two methods to determine the hard enability.

i. How does Mn affect the grain size during heating the steel above the critical temperatures?

j. What factor decides whether the cast iron will be grey or white?

SECTION-B

2. Explain how to generate a TTT diagram for an alloy.

3. Differentiate between annealing and normalizing.

4. Describe the various factors affecting the harden ability.

5. Describe the difference between edge dislocation and screw dislocation.

6. Describe phenomena of hot shortness and cold shortness.

SECTION-C

7. Explain the various types of imperfections in crystalline materials in detail.

8. Explain the various ways by which alloying elements can affect the properties of steel.

9. Explain in detail the properties and applications of Ni & Mo steels.